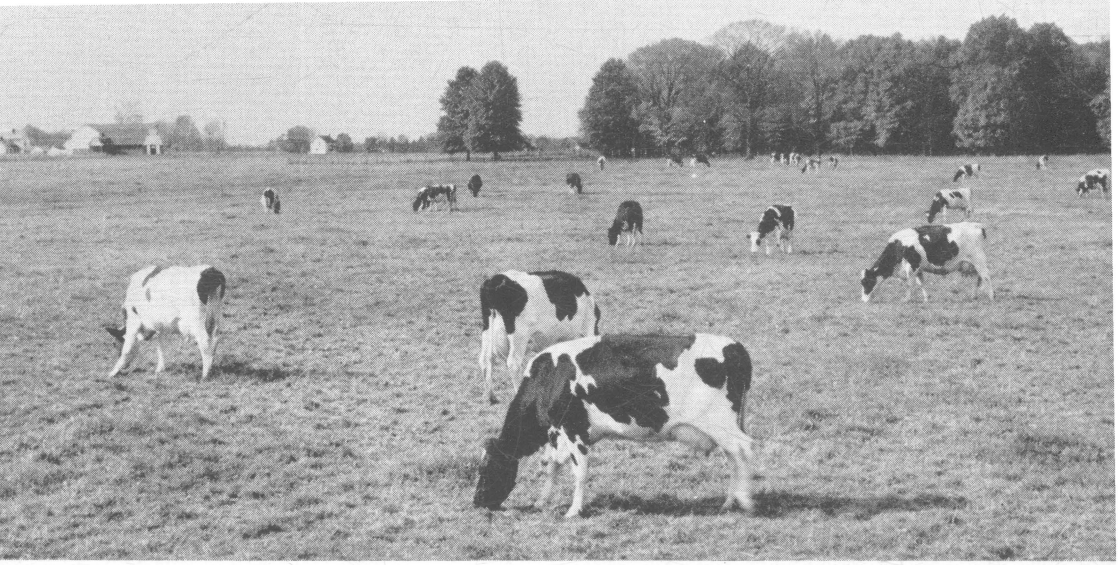

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An interim report on

MILK MARKETING DISTRIBUTION SYSTEMS IN OHIO

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Glen H. Mitchell and Elmer F. Baumer

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OHIO AGRICULTURAL EXPERIMENT STATION

Wooster, Ohio

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AN INTERIM REPORT ON MILK MARKETING DISTRIBUTION SYSTEMS IN OHIO

GLEN H. MITCHELL and ELMER F. BAUMER

This circular is of a preliminary nature and reports the first year's findings of the project entitled "An Analysis of Milk Distribution Systems." The Akron, Cleveland, Dayton and Ironton markets have been studied in 1954-55 and are reported here. A bulletin will be issued when more markets have been studied and further analysis has been made.

Background of the Problem

Methods of milk distribution vary greatly among Ohio cities. Some of these distribution systems are unique and have had wide spread interest all over the nation.

Principle differences would include (1) differences in gross spreads between consumer's and producer's prices for milk, (2) differences between retail wholesale milk prices, (3) differences in prices for various sizes of milk containers such as quart, two quart and gallon, (4) differences in prices at home and at store and (5) differences in amounts purchased through various sizes of containers and through home or store purchases. Promotional efforts in the markets studied also differed.

Various groups including consumers, processors and producers are interested in the effect of these differences.

Importance of the Dairy Industry

In 1954, over 133,000 Ohio farmers[1] had dairy herds. The sale of dairy products rates number one as the chief cash income for Ohio farmers. Approximately 23 percent of the Ohio farm gross income in 1953 came from the sale of dairy products (including veal calves and cull cows).

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[1]Smith, M. G. and Futhey, G. R. Estimated Cash Receipts by Ohio Farmers from the Sale of Agricultural Products and from Governments Payments by Counties—1953, Mimeograph No. 249, Dept. of Agricultural Economics, Ohio State University, Columbus, Ohio, 1954, Pg. 3.

There are approximately 668 dairy processors in Ohio who have large investments in plants and equipment. The nature of the distribution systems would effect their operations and expenditures.

Consumers have a large stake in the nature of milk distribution and milk prices. Approximately 15 percent of the consumer's food dollar is spent for milk and milk products. Milk is considered by nutritionists as one of the basic or protective foods.

As a nation, the dairy industry is important because of its value in human nutrition and also because of its size. In 1954, over two billion dollars was grossed in the dairy business.

Approach of This Report

This report deals with the first years findings of a three-year project on "Analysis of Milk Marketing Systems in Ohio." As certain institutions or milk distribution systems have arisen, consumer response are of considerable importance. The response by consumers to milk marketing systems is vital for (1) satisfying consumer desires and (2) examining various systems as a means to expand milk consumption.

Dairy processors and corporative association leaders desire more information on consumer reaction to various price levels, various types and sizes of containers, home and store delivery and other services. Thus the processor would have better guideposts for making decisions to maximize consumer satisfaction and profits. The individual dairy farmer is keenly interested in any distribution program which would expand the demand for milk at a desirable price.

This publication deals with the conditions existing in the four markets (Akron, Cleveland, Dayton and Ironton) and the reaction of consumers to these various milk distribution systems. In some instances, a previous study made in Columbus by Baumer, Pollock and Williams in 1953 is used for comparative purposes. A fuller account of differences in milk marketing systems will be found in a forthcoming research publication. Also, an analysis of the effect of various type and sizes of containers is the subject of another section of this project. A future study will include the cities of Toledo, Cincinnati, Youngstown and perhaps Canton or Warren.

This report discusses problems which have constantly bothered dairy marketing people:

(1) What are the differences between various milk marketing systems?

(2) What is the per capita consumption in these cities? by various income groups? by type of delivery? by size of containers?

(3) What is the trend of home versus store delivery?

(4) What is the relative amount sold in various sizes of containers?

(5) What is the trend of paper versus glass containers?

The four markets chosen were selected for their diversity and particular individual characteristics.

Methodology

Actual data about prices and individual market characteristics were obtained by actual observation, use of company records and the interviews with dairy plant managers, dairy cooperative managers, market milk administrators, and chain store operators. The cooperation of the whole industry was gratifying.

No generally accepted figures are available showing per capita milk consumption in Ohio cities. A principal problem is the lack of information about how much fluid milk is sold in any defined area. To overcome this problem it was decided to go directly to the consumer. Numerous checks on the accuracy of these consumer reports were made.

After a thorough examination of possible techniques, telephone and personal interview was used in the Akron market. In later surveys in Cleveland, Dayton and Ironton markets only the telephone was used.

The number of households interviewed in Akron, Cleveland, Dayton, Ironton and Columbus were 1044, 2003, 1000, 152 and 1000 respectively. The sample was stratified according to census tracts. Individual households were chosen at random from within the census tract. Phone calls were made in the mornings, afternoons, and evenings.

Response rate by the telephone method averaged over 90 percent. The degree of reliability of the data were analyzed from several aspects. Checks were made with dairy plant route books and with what consumers reported they purchased in approximately four hundred cases. Consumer errors in aggregate actual consumption were so small to be considered negligible. In the 400 cases cited, the amount purchased and the amount said to be purchased varied in the aggregate less than 1 percent. Further checks were made using market administrator data.

Markets and Market Differences

The metropolitan area was used in all cases rather than the city proper. For example, the Akron market does include the cities of Akron, Barberton and Cuyahoga Falls. The Cleveland market area includes Cleveland, all of Cuyahoga County and part of Lake County.

TABLE 1.—Population, Average Family Size and Median Income of Urban Akron, Cleveland, Columbus, Dayton and Ironton, 1949*

City	Population	Average family size	Median income
Akron	66,765	3.34	$3251.
Cleveland	1,383,599	3.31	3446.
Columbus	437,707	3.20	3203.
Dayton	346,864	3.31	3382.
Ironton	16,333	3.23	2687.

*Source: U. S. Census of 1950.

The criterions for the marketing area were (1) that the area was served by the same dairies, (2) the area urbanized and contiguous to the principle city and/or (3) was considered part of the urban area of the metropolitan district by the U. S. Census or the local chamber of commerce. The four principal markets studied (Akron, Cleveland, Dayton and Ironton) vary considerably in population; some in family income but little in family size.

Additional Market Facts

A relatively high level of employment existed in all markets at the time of the study.

Two quart and one quart milk containers in paper and glass were found in all markets both in store and for home delivery. Gallon jugs were found in all markets except Columbus. In none of the markets were gallon jugs home delivered. The number of stores selling milk in gallon jugs was considerably higher in Akron than any other city.

In Dayton, Columbus and Ironton, there was a 1 cent per quart differential for homogenized over regular milk. In Ironton, the store price of milk generally was the same or higher than home delivered prices. In the other markets, home delivered announced prices were higher than store delivered prices. Milk in multiple unit containers generally sold at a lower price per quart than milk in one quart containers.

Table 2 shows the range of prices that existed in the markets during the time of the survey.

Prices paid by consumers for milk were extremely difficult to trace due to the large variety in type and sizes of containers offered, range of prices for the same product, discounts offered, and the proportion of milk sold by type of outlets and many others. A more detailed study of these differences is anticipated.

TABLE 2.—Range of Announced Prices for Regular Standardized Milk During the Time of the Study in Four Ohio Cities According to Different Method of Delivery and Size of Container, 1954-1955*

City	One Quart		Two Quart		Gallon Store
	Store	Home	Store	Home	
Akron	20–21¢	21¢	32–36¢	36–38¢	61–62¢
Cleveland	19–22¢	20–21¢	31–38¢	37¢	58¢
Dayton	19–21¢	21¢	35–41¢	41¢	65¢
Ironton	23¢	22–24¢	44–46¢	43–46¢	83¢

*Homogenized milk priced at one cent per quart higher than regular milk in the Dayton and Ironton markets.

A brief outline of discounts offered follows. In Cleveland, it was a common practice to allow a one cent per quart or unit discount if 75 or more quarts or units were purchased per month on home delivery. There were no known home delivery discounts existing in Dayton or Ironton. In Akron, discounts were reported on the following schedule: 1¢ a quart on 60 units per month, 2¢ a quart on 90 units per month and 3¢ a quart on 120 units per month. Not all Akron companies or customers participated in this schedule of discounting.

Table 3 shows the weighted average price of the milk purchased at the time of the survey by the households in the sample. No attempt was made to show the effects of discounting on home delivered purchases. A general price decrease of 1 cent per quart occurred between the time of the Akron survey and the Cleveland survey.

All cities studied except Cleveland had three day a week home delivery. Cleveland has every other day home delivery.

TABLE 3.—Average Price Paid for Milk per Quart in Four Ohio Cities at the Time of the Study, 1954-1955*

City	Date		Cents
Akron	September-October	1954	17.96
Cleveland	March-April	1955	19.47
Dayton	January-February	1955	20.57
Ironton	November	1954	22.72

*Not adjusted for retail discounts or for differences between homogenized and standardized milk.

From interviews conducted in the markets, there was evidence that advertising and promotional efforts in the Dayton market were more intense and had been carried on for a longer time than in the other markets studied. Recently, the Cleveland market also embarked upon a rather intensive advertising program. Many dealers did brand advertising in newspapers, radio, and television. Brand advertising plus price difference was particularly evident in the Akron market.

Place of Purchase (Home–Store)

Table 4 indicates that a considerable degree of variation exists among the cities reported here, in the per cent of milk purchased at home and at the store.

Home delivery predominates in Cleveland, Columbus and Dayton, whereas in the Akron and Ironton markets most milk is store purchased. A unique situation existed in Ironton due to the fact that in this city families have a large percent of their groceries home delivered. Milk is often included in this grocery list.

Type of Container (Paper–Glass)

Akron with a large volume sold in glass gallon jugs and glass two quart containers at the store was the leader in the percent of milk sold in glass. Columbus, on the other hand, had a high percent packaged in paper due primarily to the large amount sold in paper two quarts home delivered. In Cleveland and Dayton, over one-half of the milk sold was packaged in one quart glass home delivered. A large percent of milk packaged in paper containers in Ironton was sold in the one quart unit.

Indications exist in this study that consumers will accept and often prefer the type of container they are currently receiving. For example, consumers were asked in this study: "Assuming price to be the same,

TABLE 4.—Percent of Total Fluid Milk Purchased Home Delivery and Through Stores in Five Ohio Cities, 1954-1955

Home	City	Store
37	Akron	63
63	Cleveland	37
73	Columbus	27
78	Dayton	22

which containers do you prefer?" The answers to this question were as follows for the various groups on consumers in the Akron, Cleveland, Dayton and Ironton markets:

	Preference		
	Paper Percent	Glass Percent	No Preference
Those purchasing all milk at store	53.1	39.4	7.5
Those purchasing all milk home-delivered	20.2	73.6	6.2
Those purchasing from both store and home-delivered	31.8	62.7	5.5
Those purchasing all milk in paper	71.9	22.4	5.7
Those purchasing all milk in glass	17.6	75.4	7.0
Those purchasing in both glass and paper	37.3	57.0	5.7
Those purchasing all milk home-delivered in paper	56.3	40.4	3.3
Those purchasing all milk home-delivered in glass	16.5	77.2	6.3
Those purchasing all milk in paper at the store	75.7	18.0	6.3
Those purchasing all milk in glass at the store	21.1	69.9	9.0

Some differences exist among the individual markets studied especially in the column headed "Those purchasing all milk at store." For the Akron market 29.1% of the households who purchase all milk at the store prefer the paper container while in Cleveland and Dayton for the same group of consumers 67.2% and 67.9% respectively preferred the paper container.

TABLE 5.—Volume of Milk Sold by Type of Container in Fve Ohio Cities, 1953-1955

Glass	City	Paper
Percent		Percent
81	Akron	19
72	Cleveland	28
54	Columbus	46
70	Dayton	30
55	Ironton	45

Percent of Milk Sold by Size of Containers

Approximately one-third of all fluid milk sold in the Akron market was sold in the gallon jug. In no other Ohio market studied thus far does the gallon jug sell such a substantial segment of the total market. Milk in gallon jugs was not sold in the Columbus market or within the city limits of Cleveland. In several Cleveland suburbs, however, milk was sold in gallon jugs. Only about 2% of the total milk sold in Dayton and Ironton markets was sold in gallon jugs, despite an approximate 3¢ a quart discount. There appeared to be a significant difference among the markets in the number, kind and location of outlets offering milk in gallon jugs.

TABLE 6.—Percent of Fluid Milk Sales by Type of Container in Five Ohio Cities, 1953-1955

City	Gallon	2 Qt.*	1 Qt.
Akron	34	27	39
Cleveland	05	26	69
Columbus	00	40	60
Dayton	02	20	78
Ironton	02	24	74

*Includes two connected single quarts sold at the half gallon price.

One-fifth or more of the total milk sales in each market was in the two quart container. In Columbus where there was no competition from the gallon jug, 40% of all sales were in the two quart container. The two quart container was introduced into this market with much promotion, advertising, less butterfat and a lowered price. Despite the impact of multiquart containers, the one quart container outsold every other size.

As the average size of family purchasing milk decreased, the size of container that milk was purchased in decreased. Table 7 shows the average size of family purchasing the various sizes of container. In this table it is possible for a family that bought milk in all three sizes to be included in the averages of all three sizes. However, less than 10 percent of the families purchased in more than one size of container.

TABLE 7.—Average Size of Family Purchasing Milk in Various Sizes of Containers in Four Ohio Cities, 1954-1955

City	Container Sizes		
	Gallon	2 Quart	1 Quart
Akron	3.83	3.57	3.21
Cleveland	4.26	3.66	3.22
Dayton	4.41	3.89	3.32
Ironton	5.0	3.48	3.29

Average Fluid Milk Consumption per Capita[2]

Average fluid milk consumption per capita in all five cities was above the national average per capita fluid milk consumption. These fluid milk consumption data include regular, homogenized, skim milk, buttermilk and chocolate milk but does not include cream, ice cream, cottage cheese or other processed products. Consumption both inside and outside the home such as consumption at work, restaurant and schools is also included.

Per capita consumption for the Akron market was approximately 25% over the national average. Per capita consumption in the Cleveland and Dayton markets was about 20 percent over the national average. Columbus was found to be approximately 11 percent over and Ironton roughly 3 percent over the national average.

TABLE 8.—Average Fluid Milk Consumption per Person in Five Ohio Cities, 1953-1955

Pints per Day	City	Annual Pounds
.956	Akron	375
.915	Cleveland	359
.843	Columbus	331
.914	Dayton	359
.783	Ironton	307

[2]The national average per capita fluid milk consumption in 1954 was 299 pounds according to **The Dairy Situation,** U. S. Dept. of Agriculture, Washington, D. C., October 18, 1954, pg. 16.

Per Capita Consumption by Type of Delivery

Per capita consumption was highest in all cities when families bought both at the store and at home. These families bought milk more times per week than did the families who bought only at home or those families who bought only at store. They also had larger families than those buying either at store or at home (Table 9). Approximately 10 percent of the families in Akron, Dayton and Ironton bought both at the store and at the home. In Cleveland, approximately 14 percent of the families bought both at the store and the home.

In Akron and Columbus, the families buying all milk at the store had a higher per capita consumption than families buying entirely at the home. In Dayton, Cleveland and Ironton markets, the families who purchased milk home delivered only had a higher per capita consumption of fluid milk. However, only in the Akron and Dayton markets was the difference very great. In Dayton, families purchasing exclusively home delivered had a per capita consumption approximately 17 percent over those families with only store purchases. In Akron 100 percent store delivery families drank about 19 percent more milk per person than did the 100 percent home delivery consumers.

Consumption by Type of Container

The following table shows the consumption per person per day by size of container in which milk was purchased. Consumer purchasing milk in more than one size container would be listed under each size purchased. However, as was previously stated less than 10% of the families purchased milk in more than one size of container.

TABLE 9.—Average per Capita Consumption of Fluid Milk, Purchased Both Home Delivered and at Stores, 1953-1955

(Pints)

City	Store	Home	Mixed
Akron	1.03	.86	1.04
Cleveland	.91	.90	1.08
Columbus	.80	.82	1.02
Dayton	.81	.95	1.05
Ironton	.76	.79	1.22

TABLE 10.—Average Family Size According to Type of Milk Delivery in Four Ohio Cities, 1954-1955

City	All Store	All Home	Home & Store
Akron	3.45	3.39	3.94
Cleveland	3.31	3.42	3.94
Dayton	3.04	3.50	4.04
Ironton	3.37	3.37	4.25

The gallon jug users had the highest per capita consumption of milk in the Akron and Cleveland markets, but were the lowest in the Dayton and Ironton markets. The number of families interviewed buying milk in the gallon jug in the Akron and Cleveland markets were 264 and 69 respectively. For the Dayton and Ironton markets 17 and 2 families respectively were interviewed who purchased milk in gallon jugs.

TABLE 11.—Daily per Capita Consumption of Fluid Milk by Size of Container Purchased in Four Ohio Cities, 1954-1955

(Pints)

City	Gallon	2 Qt.	1 Qt.
Akron	1.16	.98	.86
Cleveland	1.14	.99	.90
Dayton	.77	1.05	.91
Ironton	.62	1.05	.75

Weekly Fluid Milk Consumption per Person by Family Income

The following chart shows the weekly fluid milk consumption per capita by family income in the four cities studied during 1954 and 1955.

The increase in consumption varies among cities as income increases. After family income reaches thirty-five hundred dollars a year, consumption changed very little if any. In all cases, consumption decreases with the highest family income levels. Family composition may play an important role in this decrease.

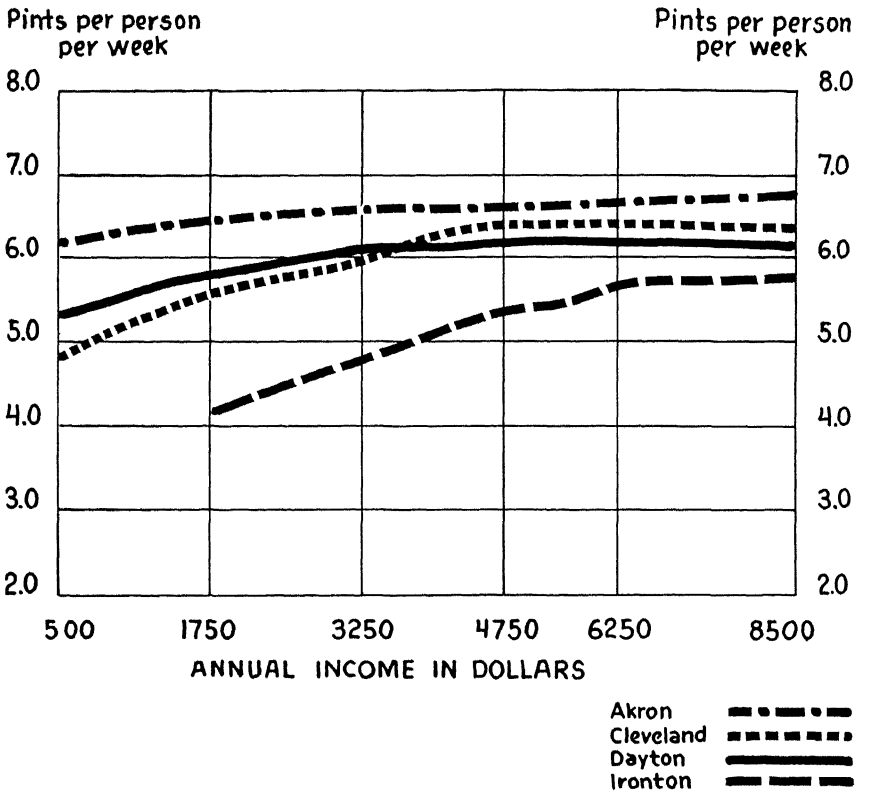

Fig. 1.—Weekly fluid milk consumption by family income in four Ohio cities, 1954-55.

Akron's per capita milk consumption is higher in all income groups than any other city. The most pronounced difference is in the lowest income group. Ironton's per capita milk consumption is lower in all income groups than any other city studied.

General: Further analysis is underway on all factors listed in this report. Subsequent reports will be issued as this research is completed.